6.1

#6

(a) $x = f(t) - 2$
$y = g(t) + 2$

(b) $x = f(t)$
$y = 2g(t)$

(c) $x = 2f(t)$
$y = g(t)$

(d) $x = f(t)$
$y = -g(t)$

Toolkit

concept: Parametrics (lines) Sect. 6.1

Parametric equations: x & y-variables each written as a function of a 3rd variable, or parameter, t.

$x_t = x_0 + at$

$y_t = y_0 + bt$

a - controls x-axis stretch

b - controls y-axis stretch

x_0 - x-coordinate when $t=0$

y_0 - y-coordinate when $t=0$

endpoints: plug max/min t-values in to x_t and y_0

slope: $\frac{b}{a}$

6.2 – Eliminating the parameter

$x = t + 2 \qquad y = t^2$

Solve one equation for t, substitute into the other.

$x - 2 = t \qquad y = t^2 \implies y = (x-2)^2$

#1

(a) $y = x^2 - 2x + 1$

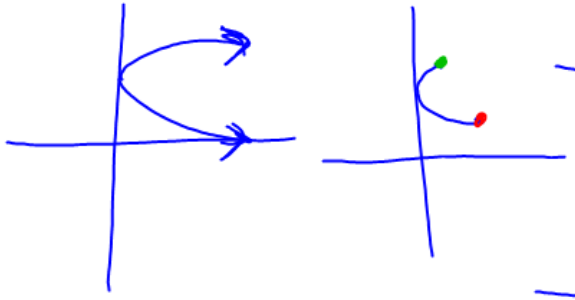
$y = (x-1)^2$

(b) $y = \frac{2}{3}x + 1\frac{2}{3}$

$y = \frac{2x+2}{3} + 1$

$y = 2\left(\frac{x+1}{3}\right) + 1$

(c) $y = \pm\sqrt{x} + 3$



$\rightarrow y_1 = \sqrt{x} + 3, \quad x \le 1$

$(\sqrt{x} + 3)/(x \le 1)$

$\rightarrow y_2 = -\sqrt{x} + 3, \quad x \le 4$

$(\sqrt{x} + 3)/(x \le 4)$

End points

$x = t^2 \quad y = t + 3$

$x = (-2)^2 \quad y = -2 + 3 \rightarrow (4, 1)$

$x = (1)^2 \quad y = 1 + 3 \rightarrow (1, 4)$

#1d

$x_t = t - 1$ $\quad y_t = \sqrt{4 - t^2}$ $\quad -2 \le t \le 2$

$x_t = 2 - 1$ $\quad y_t = \sqrt{4 - (2)^2}$ $\quad$ endpoint

$= 1$ $\quad = 0$ $\quad (1, 0)$

$x = -2 - 1$ $\quad y_t = \sqrt{4 - (-2)^2}$ $\quad$ endpoint

$= -3$ $\quad = 0$ $\quad (-3, 0)$

$f(x) = \sqrt{4 - (x+1)^2}$